

**RECEIVED
CENTRAL FAX CENTER****OCT 27 2006**

Serial No. 10/671,887
Docket No. YOR920030010US1 (YOR.424)

AMENDMENTS TO THE CLAIMS:

1. (Original) A method of executing a matrix subroutine, said method comprising:

storing data for a matrix subroutine call in a computer memory in an increment block size that is based on a cache size.
2. (Original) The method of claim 1, further comprising:

retrieving said data from said memory in units of said increment block; and

executing at least one matrix subroutine using said data.
3. (Original) The method of claim 1, wherein said data is stored contiguously.
4. (Original) The method of claim 1, wherein said cache comprises a cache having a size NB and said block increment size comprises a block of size $2NB$ by $NB/2$.
5. (Original) The method of claim 1, wherein said cache comprises an L1 cache, said L1 cache representing a cache closest to at least one of a Central Processing Unit (CPU) and a Floating-point Processing Unit (FPU) of a computer system associated with said computer memory.
6. (Original) The method of claim 1, wherein said matrix data is loaded contiguously in said memory in increments of a memory line size LS and data is retrievable from said memory in units of LS.

Serial No. 10/671,887

Docket No. YOR920030010US1 (YOR.424)

7. (Original) The method of claim 2, wherein said at least one matrix subroutine comprises a matrix multiplication operation.
8. (Original) The method of claim 2, wherein said at least one matrix subroutine comprises a subroutine from a LAPACK (Linear Algebra PACKage).
9. (Original) The method of claim 2, wherein an entire block is executed by said subroutine as a result of a call for data.
10. (Currently amended) An apparatus, comprising:
- a processor for processing a matrix subroutine;
 - a cache associated with said processor; and
 - a memory, wherein said memory ~~loads a~~ stores data for memory calls of said matrix subroutine as contiguous data in an increment block size that is based on a dimension of said cache and loads said blocks of data into said cache for said matrix subroutine processing.
11. (Original) The apparatus of claim 10, wherein said cache comprises a cache having a size NB, and said block increment size comprises a block of size $2NB$ by $NB/2$.
12. (Original) The apparatus of claim 10, wherein said matrix subroutine comprises a matrix multiplication operation.

Serial No. 10/671,887
Docket No. YOR920030010US1 (YOR.424)

13. (Original) The apparatus of claim 10, wherein said matrix subroutine comprises a subroutine from a LAPACK (Linear Algebra PACKage).
14. (Currently amended) The apparatus of claim 10, wherein a line size of said memory is LS and data is retrieved from said memory in units of LS, each said block of data being retrieved by usually an integral number of memory line retrievals.
15. (Original) A signal-bearing medium tangibly embodying a program of machine-readable instructions executable by a digital processing apparatus, said instructions including a method of storing data for a matrix subroutine call in a computer memory in an increment block size that is based on a cache size.
16. (Original) The signal-bearing medium of claim 15, wherein said matrix subroutine comprises a subroutine from a LAPACK (Linear Algebra PACKage).
17. (Original) The signal-bearing medium of claim 15, wherein said cache comprises a cache having a size NB, and said block increment size comprises a block of size $2NB$ by $NB/2$.
18. (Currently amended) The signal-bearing medium of claim 15, wherein a line size of said memory is LS and data is retrieved from said memory in units of LS, each said block of data being retrieved by usually an integral number of memory line retrievals.

Serial No. 10/671,887

Docket No. YOR920030010US1 (YOR.424)

19. (Original) A method of solving a problem using linear algebra, said method comprising at least one of:

initiating a computerized method of performing one or more matrix subroutines, wherein said computerized method comprises storing data for a matrix subroutine call in a computer memory in an increment block size that is based on a cache size;

transmitting a report from said computerized method via at least one of an internet interconnection and a hard copy; and

receiving a report from said computerized method.

20. (Original) The method of claim 19, wherein said cache comprises a cache having a size NB, and said block increment size comprises a block of size $2NB$ by $NB/2$.

21. (Currently amended) A method of providing a service, said method comprising an execution of a matrix subroutine in accordance with the method of ~~claim 1~~; claim 1.

22. (Original) A method of providing a service, said method comprising at least one of:

solving of a problem using linear algebra in accordance with the method of claim 19; and
providing a consultation to solve a problem that utilizes said computerized method.

23. (New) The method of claim 1, wherein a working size of said cache for said matrix data is approximately $NB \times NB$, wherein said matrix to be processed comprises submatrices, and wherein data of said submatrices are stored in memory as rectangular blocks of contiguous data that will each fit into said cache working size.

Serial No. 10/671,887
Docket No. YOR920030010US1 (YOR.424)

24. (New) The method of claim 23, wherein said rectangular block of data stored in said memory comprises a rectangular block of size $2NB$ by $NB/2$.

25. (New) The method of claim 23, further comprising:

processing said rectangular blocks of matrix data by calling a DGEMM (Double-precision Generalized Matrix Multiply) kernel a plurality of times, using each one of said rectangular blocks of contiguous data with each said DGEMM kernel call.

26. (New) The method of claim 25, wherein data for all operands used in said DGEMM kernel comprise data stored as contiguous data in lines of said memory such that data for each said operand can be retrieved as contiguous data from said memory using usually an integral number of memory line retrievals respectively appropriate for each said operand.

27. (New) The method of claim 23, said method further comprising:

for data of said matrix, preliminarily converting and storing in said memory said data of said matrix into a number of rectangular blocks of contiguous data that will each fit into said cache size approximately $NB \times NB$, including, if necessary, adding padding data to fill up a block or a complete line of memory, said padding chosen to have no effect on a calculation result of said matrix subroutine call.